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ASTER LATERIFLORUS AND SOME OF ITS RELATIVES.

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SEVERAL years ago when the writer was engaged in a special study of the flora of Central New York, great difficulty was found in the identification of many of the specimens of Aster. Particularly was this true of the species passing as *A. lateriflorus* and *A. paniculatus*. In an attempt to reach a better understanding of these forms, special attention was finally given to them, and the study was continued at the Gray Herbarium. The material in the Gray Herbarium, therefore, has served as the basis for the study, but this has been supplemented by the material in the herbarium of the New England Botanical Club and the herbarium of Cornell University. In all about 1200 specimens have been examined. The work has extended over several years, and many provisional treatments have been tried. The one presented below has met with little change during the later stages of the study, and probably represents very nearly the true situation regarding the taxonomy of this group of species. The difficulties encountered have led the writer to appreciate Dr. Gray's comment on the genus Aster as a whole. He says:¹ "Aster is far the most difficult of our genera [in the Compositae], both for the settlement of the names of the species and for their limitation, in respect to which little satisfaction has been attained as the result of prolonged and repeated studies."

At first no evidence that hybridization could be a factor in the confusion was apparent, and it was concluded that hybridization did not occur, or at least but rarely. Gradually, however, the conviction

¹ Synopt. Fl. i. pt. 2. 172.

grew that crossing between the species in the wild did occur, and was indeed one of the principal causes of the existing confusion. This fact once understood, the group speedily became much clearer. Circumstantial evidence points more and more toward the frequent occurrence of hybridization in *Aster*, at least in certain groups, and a few artificial hybrids have been produced in other groups than the present one. These hybrids strongly resemble forms occurring in nature. Indeed the number of specimens in any herbarium that under this hypothesis must be interpreted as of probable hybrid origin is rather large. But it must be remembered that in the case of common species, like *A. lateriflorus* and *A. paniculatus*, collectors are much more likely to bring in unusual or abnormal specimens that are difficult to identify than the ordinary and easily recognized forms of the species. The percentage of specimens of hybrid origin occurring in herbaria is, therefore, much higher than it is likely to be in nature.

Another cause of great structural variations in these species is their ready response to fluctuations in environment. Changes in soil water, soil composition, and light intensity, as well as the operation of mechanical or pathological injury, often produce results which suggest specific or at least varietal difference. This is all so complicated that in the case of herbarium specimens, where the exact environment of the living plant is unknown, only approximate accuracy in interpretation can be secured.

In the course of this study certain characters have been found of value which have not been heretofore generally employed, as for instance the exact length of the involucre and the inner involucre bracts, the number of rays, and the shape of the limb in the disk-corolla as well as the length and character of its lobes. These characters of the disk-corollas are particularly interesting, as three of the species here treated, *A. lateriflorus*, *A. vimineus* and *A. dumosus*, are quite unlike in these respects.

The nomenclature of this group of asters is, as Dr. Gray has noted, extremely unsatisfactory. The writer has had no opportunity to inspect types in European herbaria, but has accepted provisionally the interpretation of other authors, particularly Dr. Gray. In many cases the older names were based on plants growing over a long period of time in European gardens. Specimens from some of these old races are in the Gray Herbarium. Unfortunately, neither

these specimens nor the original descriptions fit exactly any known asters in the wild state. These garden plants have either become modified through cultivation, or have become hybridized, or have been propagated from accidental collections of natural hybrids. In every case where definable, these older names have been given their proper place in nomenclature, but many of them must apparently be laid aside. Another difficulty lies in the fact that several specific names and a number of varietal names have been based on ecological responses, or on hybrids, and do not represent real races.

- a. Leaves pubescent only on the midrib beneath or glabrous (often scabrous above). b.
- b. Lobes of the disk-corollas 0.4–0.8 mm. long, 21–41(–43) % of total length of limb, erect, or spreading; the limb usually funnel-form: midrib beneath glabrous: rays 9–30 c.
- c. Heads of medium size or large for the group, usually on long minutely bracted peduncles, scarcely racemose or unilaterally disposed: involucre 4–7.8 mm. high; bracts often with rhombic somewhat dilated tips; inner 3–6 mm. long: ray-corollas 5.2–9 mm. long: rameal leaves only moderately unequal, often uniform d.
- d. Rameal leaves mostly spreading or reflexed, except toward ends of peduncles, oblong or linear-oblong, obtuse or barely acute at each end, more rarely abruptly mucronulate. e.
- e. Rays 19–26: cauline leaves 3–5 cm. long; rameal rather thin (except in some Cape Cod to Long Island plants) 1. *A. dumosus*
- e. Rays 9–17(–19): cauline leaves usually narrower and longer, (3–)4–9 cm. long, often very narrow; rameal rather thick, often extremely so: rays often broader var. *coridifolius*.
- d. Rameal leaves mostly ascending or appressed, sometimes spreading, linear or linear-subulate, acute, soft or firm.
- e. Branches few: peduncles long and divaricate: involucre bracts mostly broad: rays 14–17(–20): cauline leaves linear or elliptic-linear, 3–7 cm. long. var. *gracilipes*.
- e. Branches abundant (confined to upper part of plant in var. *strictior*), ascending or spreading: leaves usually narrow, up to 15 cm. long: involucre bracts rather narrower and less imbricated in some varieties. f.
- f. Peduncles usually all long and slender: plant open, twiggy and wiry, much branched: rameal leaves short, rather uniform, ascending or spreading: stems and branchlets glabrate: (rays 15–25) var. *pergracilis*.
- f. Peduncles, or many of them, short or even wanting: plant more dense: rameal leaves more unequal, many of them longer and proportionally narrower. g

- g. Rays 13-16(-20): stems sparsely and very finely puberulent: inflorescence rather small and terminal. var. *strictior*.
- g. Rays 20-25: stems glabrate or scabrous-puberulent or strigose with coarser hairs: plant and inflorescence diffuse. var. *subulaefolius*.
- c. Heads very small, often subracemose and frequently unilaterally disposed: involucre 3-3.6 mm. high; bracts usually narrowly linear, the inner 2.1-3.3 mm. long: ray-corollas (3-)4-5.8 mm. long: rameal leaves very unequal, irregularly spreading or ascending. d
- d. Heads scarcely solitary on the branchlets; most peduncles short: branches rather few, spreading-arching, decreasing upward: rameal leaves scarcely subulate, elliptic-linear: rays 15-22(-25) e.
- e. Rameal leaves rather soft, barely acute, mostly spreading. 2. *A. vimineus*.
- e. Rameal leaves firmer, more acute, more ascending: (branches densely flowered, usually more ascending) var. *dubius*.
- d. Heads tending to be solitary and on slender more uniformly bracted peduncles: branches longer, more spreading: rameal leaves narrower, often linear-subulate, more acute: rays somewhat more numerous, 17-30. var. *subdumosus*.
- b. Lobes of the disk corollas (1-)1.1-1.6 mm. long, 50 to 75 % of total length of limb, at length usually revolute; limb goblet-shaped: rays (7-)9-14: midrib usually pubescent beneath. c.
- c. Heads rather conspicuously subracemose or paniculate on the usually long, spreading branches. d.
- d. Leaves lanceolate to broadly lanceolate, more than 8.3 times as long as wide. e.
- e. Branches in well developed plants rather numerous: the rameal leaves not conspicuously uniform in size and position nor abruptly reduced. 3. *A. lateriflorus*.
- e. Branches fewer, when well developed long and slender, spreading or recurved: rameal leaves rather abruptly smaller than the cauline, rather uniform, tending to stand parallel, mostly narrowly elliptical; cauline usually rather short and broad, tapering somewhat equally both ways from middle. var. *pendulus*.
- d. Leaves linear or linear-lanceolate, 8.3 times as long as wide or narrower: habit as in the typical form. var. *angustifolius*.
- c. Heads more paniculate at top of plant, the inflorescence with shorter more ascending branches and usually appearing more terminal: peduncles long, slender: stems rather slender, nearly glabrous: northeastern. var. *tenuipes*.
- a. Leaves finely and rather evenly pubescent over both surfaces, but the hairs varying greatly in size and density on different plants: (rays numerous, 15-26). b.
- b. Involucre 5-6 mm. high; bracts with somewhat deltoid tips, the inner 4-4.8 mm. long: lobes of the disk-corollas 0.4-0.8 mm. long, 21-36 % of total length of limb. *A. dumosus* var. *Dodgei*.
- b. Involucre 3-4.6 mm. high; bracts scarcely at all deltoid at tip, usually narrow, inner 2.8-4 mm. long: lobes of the disk-corollas (0.7-)0.8-1.2 mm. long, (41-)45-66 % of total length of limb. c.

- c. Heads subracemose: pappus copious, soon exerted: stem rather stout: leaves 10–30 mm. wide. . . . d.
 d. Inner bracts of the involucre 3.2–4.6 mm. long: lobes of the disk-corollas (0.8–)1.0–1.2 mm. long... 4. *A. missouriensis*.
 d. Inner bracts 2.8–3 mm. long: lobes of the disk-corollas 0.7–1.0 mm. long: plant more strict, with more abundant small ascending rameal leaves and smaller more densely racemose heads..... var. *thyrsoides*.
 c. Heads paniculate: pappus scarcely exerted: stem more slender: leaves narrower, 8–15 mm. wide: plant more like *A. Tradescanti* in habit..... 5. *A. ontarionis*.

1. *A. DUMOSUS* L. Sp. Pl. ii. 873 (1753); T. & G. Fl. N. A. ii. 128 (1841), in part var. *coridifolius*; Gray, Synopt. Fl. i. pt. 2. 185 (1884), in part other varieties. ? *A. fragilis* Lindl. Bot. Reg. t. 1537 (1832).—Stems purplish, obscurely or not at all striate, finely and mostly evenly puberulent: branches usually of medium length or short, spreading or ascending: leaves linear, linear-lanceolate or narrowly elliptic, rarely slightly oblanceolate, ascending, spreading or sometimes reflexed, rather small, the cauline 3–5 cm. long or rarely longer, 4–7(–8) mm. wide, all firm, glabrous beneath, more or less scabrous above, entire, or occasionally with a very few low teeth, acute at each end or often subtruncate at base; rameal leaves small, rather uniform in size, linear-oblong, obtusish, thin, more rarely firm, sometimes abruptly mucronate, spreading or reflexed or those on the peduncles ascending, much reduced on the branchlets and peduncles and then more oblong or quadrate (5–6 mm. long) with broad base and apex: heads scarcely unilaterally disposed, mostly on long ascending peduncles, 12–15 mm. wide including the rays: involucre 4.5–5.5 mm. high; the bracts in several series, much imbricated, with conspicuous green usually rhombic tips, the inner 3.0–4.6 mm. long, mostly oblanceolate and rhombic-acute, erose at tip or ciliate, outer chiefly oblong, passing into the rameal leaves: ray-corollas 19–26, 5.2–8(–9) mm. long, 0.7–1.2(–1.4) mm. wide, pale lavender or bluish, rarely white: disk-corollas 15–30, pale yellowish or brownish, 3–4 mm. long; limb funnel-form; lobes erect or somewhat spreading, very short, 0.4–0.8 mm. in length, only 21 to 36% of total length of limb:¹ achenes nearly glabrous.—Thickets and scrubby fields, chiefly in dry sandy soils: York County, Maine (not typical), along the coast to New Jersey and Lancaster County, Pennsylvania. Two specimens from the mountain region of North Carolina seem to belong here (Waynesville, 1897, *T. G. Harbison, E. E. Magee*). Many specimens from Cape Cod, Long Island and New Jersey have somewhat thicker and more ascending rameal leaves, but possess the larger number of rays and generally crisp-puberulent stems and branches of the typical form. They have been mistaken for var. *strictior* T. & G.

Var. *CORIDIFOLIUS* (Michx.) T. & G. Fl. N. A. ii. 128 (1841). *A. coridifolius* Michx. Fl. Bor.-Am. ii. 112 (1803); Gray, Synopt. Fl. i.

¹ The corollas of the disk florets in *Aster* are composed of a slender tube and more swollen limb. The latter consists of throat and lobes.

pt. 2. 186. *A. sparsiflorus* Michx. l. c. 112. *A. dumosus* T. & G. l. c., in part the typical form. *A. dumosus* var. *gracilentus* T. & G. l. c., according to Gates specimen.—Often more diffuse: stems more or less puberulent as in the typical form: cauline leaves, except the lowermost, narrower and longer (3-) 4-9 cm. long, often narrowly linear, usually reflexed; rameal generally very small, oblong and spreading as in the typical form but thicker, often very coriaceous at least when dry: rays fewer, 9-17(-19), up to 9 mm. long and 1.8 mm. wide.—Perhaps in slightly more moist situations than the typical form: occurring rarely on Long Island and in southeastern Pennsylvania, and more commonly from the District of Columbia to southeastern Kentucky, southward to Georgia and Mississippi; apparently infrequent on the Coastal Plain. A few of the specimens examined: PENNSYLVANIA: Chester County, 1910, *E. B. Bartram*, no. 1341, possibly. DISTRICT OF COLUMBIA: Takoma Park, 1897, *T. A. Williams*; Riverdale, 1916, *E. S. Steele*. VIRGINIA: Norfolk County, 1892, *A. A. Heller*, no. 736. NORTH CAROLINA: Poney Mt., Polk County, 1897, *E. C. Townsend*; Salisbury, 1908 and 1909, *W. W. Eggleston*, nos. 4257, 5603. SOUTH CAROLINA: *Ravenel*. GEORGIA: Middle Georgia, 1846, *T. C. Porter*. FLORIDA: Apalachicola, *A. W. Chapman*. TENNESSEE: Higdon, 1898, *A. Ruth*. KENTUCKY: Bell County, 1893, *T. H. Kearney Jr.*, no. 522. ALABAMA: *Buckley*. MISSISSIPPI: Ora, 1903, *S. M. Tracy*, no. 8581; Beauvois, 1898, *Tracy*.

Var. **gracilipes**, var. nov. Ramis paucis elongatis tenuibus divaricatis subunicapitatis, ramulorum foliis parvulis subrigidis lineari-subulatis acutis subadpressis.

Stems puberulent or glabrate: branches few, long, slender and divaricate, each terminated by a head, usually glabrate: cauline leaves nearly as in the typical form, linear or elliptic-linear, ascending, 3-7 cm. long; rameal small, firm, linear-subulate, acute, ascending or appressed: involucre about as in the typical form or slightly longer; the bracts often broad: rays 14-17(-20).—Pine barrens: Florida and Louisiana. Specimens examined: FLORIDA: *Leavenworth*; 1883, *A. H. Curtiss*; Pine barrens near Jacksonville, 1894, *A. H. Curtiss*, no. 5345 (TYPE in Cornell University Herb.); 1898, *Curtiss*; Duval County, *A. H. Curtiss*, no. 1239; Brevard County, 1902, 1903, *A. Fredholm*, nos. 5617 and 6160; Orange City, 1913, *S. C. Hood*. LOUISIANA: *Hale* (apparently this variety).

Var. **pergracilis** var. nov. ? *A. sparsiflorus* Michx. Fl. Bor.-Am. ii. 112 (1803); Elliott, Bot. S. C. & Ga. ii. 346 (1824).—Diffusissima glabra vel sparse minuteque pubescens, ramis copiosis elongatis rectis tenuibus, foliis anguste linearibus erectis vel inferioribus reflexis, ramorum copiosissimis parvis subaequalibus oblongo-linearibus vel subulatis acutis saepe adscendentibus, ligulis 15-25.

Very diffuse, essentially glabrous: branchlets abundant, angular, long, straight, slender, spreading, twiggy and glabrate: leaves nar-

rowly linear, erect or the lower reflexed; rameal leaves very abundant, small, uniform, oblong-linear or subulate, acute, chiefly ascending: heads terminating the long branchlets, small or of medium size: involucre bracts generally less imbricated and tips often less rhombic: rays 15–25.—Dry (or damp?) soil: coastal plain of North and South Carolina, possibly extending to the mountains. Specimens examined: NORTH CAROLINA: Beaufort, 1922, *L. F. & F. R. Randolph*, no. 833; ? Polk County, 1897, *E. C. Townsend*. SOUTH CAROLINA: Santee Canal, *Ravenel* (TYPE in Gray Herb.); Marion, 1927, *Manning & Wiegand* (Cornell Herb.); Moncks Corners, 1927, *Manning & Wiegand*; Early Branch, 1927, *Manning & Wiegand*.

This variety is related to var. *subulaefolius*, but is more diffusely branched, with more regular rameal leaves and more regularly long-peduncled heads. Herbarium specimens have a marked twiggy heath-like appearance. The rays vary in number more than in the other varieties. The rameal leaves in this variety are less gradually acute than in var. *subulaefolius*.

Var. STRICTIOR T. & G. Fl. N. A. ii. 128 (1841).—Stems rather strict, sparingly and rather finely puberulent or glabrate: branches mostly confined to the upper part of the stem, rather short, ascending: leaves narrowly linear, 7–11 cm. long, 5–7.6 mm. wide, glabrous, sparingly scabrous above and on the margin; rameal leaves often large for the species, (4–)5–7.4 mm. long, linear or linear-elliptic, acute, ascending, not thick: involucre bracts in fewer series, the tips broad: rays few, 13–16 (–20).—Apparently in dry sandy soil: Western New York and Western Ontario to Michigan and Illinois. Specimens examined: NEW YORK: near Buffalo, 1864, *Clinton*. MICHIGAN: Fort Gratiot, *Dr. Pitcher*. ONTARIO: Sandwich, 1890, *J. Macoun*, no. 9; Windsor, 1884, *J. M. Macoun*, no. 1. INDIANA: near Ft. Wayne, 1914, *C. C. Deam*, no. 15555.

This variety has the aspect of the peculiar Cape Cod specimens of *A. dumosus* mentioned above, but the leaves are larger and narrower, the bracts longer and more acute, and the rays fewer. It is unlike var. *subulaefolius* in the number of rays, frequently puberulent stem, and general appearance of the inflorescence. In the rather fewer series of involucre bracts it tends to differ from all other varieties of this species.

Var. DODGEI Fernald, RHODORA, xi. 31 (1909).—Resembling the last named variety, but stem more pubescent, often strongly so, and with longer hairs: leaves broader and shorter, scabrous and often strigose or more densely pubescent on one or both surfaces: bracts more ciliate, in some cases more acute: rays more numerous, 18–24.—Damp or marshy ground: islands at the mouth of the St. Clair River, Michigan, and possibly the same form from Oxford, Ohio. Specimens

examined: MICHIGAN: Hersen's Island, St. Clair County, 1907, *C. K. Dodge*, nos. 16 and 17; 1908, *Dodge*, nos. 84 and 85. OHIO: Oxford, Erie County, 1902, *E. L. Moseley* (apparently this variety).

Whether this variety is a true race or of local hybrid origin is uncertain. Its very limited distribution throws suspicion on its autonomy; but if a hybrid, no other species can be readily interpreted as its other parent. It should be studied further in the field.

Var. SUBULAEFOLIUS T. & G. Fl. N. A. ii. 128 (1841). *A. foliolosus* Ell. Bot. S. C. and Ga. ii. 345 (1824), probably.—Stems much branched often to below the middle, glabrous, or sometimes pubescent, if so with coarser and more strigose hairs than in the other forms of the species, angular above: branches ascending: leaves narrowly linear, 2–5 mm. wide, sometimes 12 cm. long, ascending or the lower and older reflexed: heads very numerous, more racemose or paniculate than in the typical form, on peduncles of irregular length, often sessile; rameal leaves longer, up to 15 or 18 mm. long, more variable in length, rather soft, linear or linear-subulate, acute, mostly ascending: involucre up to 7.8 mm. long, the bracts rather narrow (except in some southern specimens) and the green tips less rhombic, usually less conspicuously imbricated than in the typical form: rays in well developed heads 20–25.—Damp or wet, rarely dry, sandy soils on the Coastal Plain and adjacent areas: Plymouth, Barnstable and Bristol Counties, Massachusetts; Newport and Kent Counties, Rhode Island; and from South Carolina to Florida; also in Louisiana and Texas. Some specimens examined: MASSACHUSETTS: Plymouth, 1913, *Fernald, Hunnewell & Long*, nos. 10588, 10589, 10594; Harwich, 1918, *Fernald & Long*, no. 17536; Barnstable, 1916, *Bean, Bird & Knowlton*; Chatham, 1918, *Fernald & Long*, no. 17534. RHODE ISLAND: Warwick, 1914, *Collins, Fernald & York*, no. 11448. SOUTH CAROLINA: Santee Canal, *Ravenel*. GEORGIA: Okefinokee Swamp, 1921, *A. H. Wright*, nos. 1102, 1103. FLORIDA: *Chapman*; Hillsborough County, 1904, *A. Fredholm*, no. 6484; Ft. Lauderdale, 1903, *A. A. Eaton*, no. 807; Lake County, 1894, *G. V. Nash*, no. 747. LOUISIANA: *Leavenworth*. TEXAS: Austin, 1835, *Drummond*; Prairies near Houston, 1842, *Lindheimer* (several specimens).

This variety is apparently common on Cape Cod, being represented by about twenty numbers in the collections studied. In the Southeastern States it seems also to be common. A majority of the specimens seen from Florida and farther west are of the older collectors, and bear Dr. Gray's identification as var. *subulaefolius*. Certain specimens collected by F. L. Harvey near Fayetteville in northwestern Arkansas were labelled by Dr. Gray var. *subulaefolius*, but they are unlike other specimens of this variety. In this case some crossing of species in the immediate vicinity is suspected.

A. dumosus presents many perplexing lines of variation the exact significance of which is often difficult to make out. This difficulty is increased by abundant hybridization with other species. The variants that seem to represent races or important trends have here been separated as named varieties. Nomenclature within this species is very difficult. For the name *A. dumosus* L. Dr. Gray's interpretation has been accepted. The identity of *A. coridifolius* Michx. is fairly certain. A fragment in the Gray Herbarium, thus labelled and coming from the Michaux Herbarium, is clearly the form here called var. *coridifolius*. Michaux's *A. sparsiflorus* of "Carolina inferiore" is poorly defined and its interpretation difficult. Dr. Gray makes it a synonym of *A. dumosus*, while Nuttall, judging from a specimen in the Gray Herbarium, interpreted it as the form here called var. *coridifolius*. It may be our var. *pergracilis*.

The peculiar race, found in Florida, with few long scattered slender branches and rather short ascending leaves is apparently without a name. It is not the var. *gracilentus* T. & G., as the only specimen in the Gray Herbarium so labelled (the Gates specimen cited by T. & G.) is an abnormal specimen of var. *coridifolius*.

The var. *strictior* T. & G. was not recognized by Dr. Gray in the Synoptical Flora. The range was given by Torrey and Gray as: "Vermont! and Michigan! to New Jersey! & c., usually in moist soil." The only specimen in the Gray Herbarium bearing the name var. *strictior* in Dr. Gray's handwriting is from Michigan (Ft. Gratiot, Dr. Pitcher). This specimen has been taken to define the var. *strictior* of the present paper. Our conception of the variety must differ from that of Torrey and Gray, however, judging from the range given. On the other hand their conception can scarcely apply to any form confined to the eastern sea coast.

The identity of var. *subulaefolius* T. & G. is well established by numerous specimens so labelled by Dr. Gray and in the Gray Herbarium, including Leavenworth's Louisiana specimen cited by Torrey and Gray. They are, however, all from the Gulf coast. Repeated examination has failed to show any difference between these southern specimens and those from eastern Massachusetts and Rhode Island, though the variety is at present not definitely known from the intervening area. The specimens from Massachusetts have recently passed under the name var. *strictior* T. & G.

2. *A. VIMINEUS* Lam. Dict. i. 306 (1783). *A. secundiflorus* Desf.

Tab. ed. 2, 268 (1815). *A. Tradescanti* T. & G. Fl. N. A. ii. 129 (1841), not L. *A. Tradescanti* var. *fragilis* T. & G. l. c.—Stems 4–15 dm. high, slender, generally purple, smooth or puberulent in lines above, usually inconspicuously striate, arching: branches many, spreading or ascending, short or moderately long, straight or arching, often crowded, gradually reduced in length upward: branchlets more or less angled: leaves linear-lanceolate or linear, tapering and acute at both ends, sparingly low-toothed or entire, when well developed 8(–11) cm. long, 6(–10) mm. wide, glabrous beneath, glabrous or very sparingly scabrous above, rough-margined: rameal leaves unequal, very numerous, irregularly spreading in all directions, oblong, oblong-linear or linear, acute or obtusish, mostly 3–7 mm. long, rather soft, more or less tortulose when dry, inconspicuously or not at all ciliolate-scabrous: heads small and often crowded, generally short-pedicelled or subsessile and more or less unilaterally subracemose: involucre 3–3.6 mm. high, the bracts generally narrowly linear, acute, soft, with narrow green midrib, glabrous or slightly ciliolate; the inner 2.1–3.3 mm. long: rays 15–22(–25), with corollas (3–)4–5.8 mm. long, 0.5–0.9 mm. wide, usually spreading, white or rarely purplish: disk-corollas 2.5–3.3 mm. long, pinkish purple; limb funnel-form, the lobes 0.6–0.8 mm. long, 38–41% of total length of limb, erect or ascending: achenes small, sparingly hairy.—Dry or somewhat damp shores and fields, in light, chiefly acid soils: along the coast from Androscoggin County, Maine to Virginia; also extending inland in southern New Hampshire and southern Vermont. Not seen from the Berkshire region of New England, nor from New York State except near New York City. No specimens have been seen by the writer from south of Virginia.

Var. **dubius**, var. nov. Strictior, capitulis confertis saepe majoribus, foliis caulinis sublanceolatis, foliis ramulorum rigidioribus adscendentioribus.

More strict, with more arching-ascending branches, and more subspicately racemose crowded heads: cauline leaves more often lanceolate: rameal leaves more rigid and acute, more ascending, and more scabrous-ciliate: heads often slightly larger.—Dry or damp ground: southern Maine, New Hampshire and Vermont to Connecticut, eastern Pennsylvania and Maryland. Some specimens examined: MAINE: North Berwick, 1894, *J. C. Parlin*. NEW HAMPSHIRE: Hinsdale, 1919, *C. F. Batchelder*; Jaffrey, 1887, *B. L. Robinson*, no. 386 (TYPE in Gray Herb.). VERMONT: Wallingford, 1898, *W. W. Eggleston*, no. 626. MASSACHUSETTS: Andover, 1903, *A. S. Pease*; Essex, 1913, *Fernald, Hunnewell & Long*, no. 10598; Framingham, 1911, *A. J. Eames*; Lake Massapoag, Sharon, 1899, *E. F. Williams*; Brookline, 1887, *E. & C. E. Faxon*, no. 23; Middleboro, 1921, *C. H. Knowlton*; Mt. Warren, Hampshire County, 1873, *W. H. Blanchard*. RHODE ISLAND: Cumberland, 1903, *E. F. Williams*. CONNECTICUT: Glastonbury, 1903, *A. W. Driggs*, no. 2199; Bolton, 1907, *A. W. Driggs*; Middletown, *J.*

Barratt. NEW JERSEY: Freehold, 1852, *Hexamer & Maier*. PENNSYLVANIA: Easton, 1878, *T. C. Porter*; Harrisburg, 1888, *Porter*, MARYLAND: Hyattsville, 1914, *E. S. Steele*.

Var. **subdumosus**, var. nov. Diffusa, ramis patentibus, capitulis subsolitariis, pedunculis tenuibus bracteatis saepe elongatis, foliis ramulorum anguste linearibus vel elliptico-linearibus acutis plerumque divaricatis.

Diffusely branched, with wide-spreading branches: heads tending to be solitary on slender, bracted, often elongated branchlets or peduncles: rameal leaves narrowly linear or narrowly elliptic-linear or linear-subulate, acute, mostly spreading: involucral bracts usually very narrow: rays 17–30.—Low ground: Alabama, Missouri and Illinois, and possibly elsewhere in the lower Mississippi Valley. Specimens examined: ALABAMA: Auburn, 1891, *G. F. Atkinson*. MISSOURI: St. Louis, 1886, *H. Eggert*; Dunklin County, 1892, *B. F. Bush*, no. 35. ILLINOIS: 1881, *J. Wolf*; near St. Louis, 1874, *H. Eggert*; Olney, 1914, *R. Ridgway*, no. 68 (TYPE in Gray Herb.).

Dr. Gray's interpretation of the name *A. vimineus* Lam. as applying to this species has been accepted. The original description agrees well with our plants but Lamarck gave the source of his specimen as Canada.

The typical form of *A. vimineus* is rather uniform as to structural characteristics, and fairly easy of recognition. However, many specimens ordinarily referred to this species appear aberrant and are probably of hybrid origin. They have, in different cases, broader leaves, more diffuse straggling branches, more striate or angular branches and branchlets, more subulate and more ascending rameal leaves, larger heads, broader involucral bracts, as well as variations in rays and in disk corollas. Apparent hybrids with *A. ericoides*, *A. novi-belgii*, *A. undulatus*, *A. lateriflorus*, *A. dumosus*, *A. missouriensis* and *A. paniculatus* have been noted, those with the latter species being much the most common. A certain series of rather uniform specimens, having the appearance of hybrids with *A. lateriflorus* or *A. paniculatus* and its relatives, but needing further study, have been segregated provisionally as var. *dubius*, owing to the uncertainty as to whether they may not after all represent a real race.

The var. *subdumosus* seems worthy of recognition. Heretofore plants of this variety have been variously identified. Two of the four specimens that bear Dr. Gray's handwriting were named by him *A. vimineus* var. *foliolosus*. One other bears the name *A. vimineus* (?), and the fourth *A. dumosus*. Other later specimens have been mostly named *A. vimineus* or *A. dumosus*.

The status of the name var. *foliolosus* Gray (*A. dumosus* var. *subracemosus* T. & G. in part, according to Gray) is not entirely clear. The range given in the Synoptical Flora is, "New England to Illinois." The two eastern specimens so named by Gray are, one, *A. vimineus*, and the other apparently *A. dumosus* × *vimineus*; while the seven western are distributed among *A. vimineus* var. *subdumosus*, *A. ericoides* × *A. vimineus* var. *subdumosus*, and *A. missouriensis* var. *thyrsoides* × *A. vimineus* var. *subdumosus*. The original *A. foliolosus* Ait., on which Dr. Gray's name was based, apparently was a garden form doubtfully referable to any wild type. In the interest of clarity the name may be laid aside.

A. vimineus var. *saxatilis* Fernald (RHODORA i. 188, 1899. *A. saxatilis* Blanchard, Amer. Bot. vii. 26, 1904) more properly belongs to the *paniculatus-Tradescanti* group, and is not included here.

A. racemosus Ell., of the southeastern United States, superficially resembles *A. vimineus*, but is in reality a relative of *A. ericoides*. The involucrel bracts have thick, more or less pointed tips, and the leaves are scabrous-puberulent on both faces.

3. *A. LATERIFLORUS* (L.) Britton. *Solidago lateriflorus* L. Sp. Pl. ii. 879 (1753). *A. lateriflorus* Britton, Trans. N. Y. Acad. Sci. ix. 10 (1889). ? *A. diffusus* Ait. Hort. Kew. iii. 205 (1789); Gray, Synopt. Flora (largely var. *pendulus*). ? *A. recurvatus* Willd. Sp. Pl. iii. 2047 (1803). ? *A. Tradescanti* Michx. Fl. Bor. Am. ii. 115 (1803), not L. *A. miser* Nutt. Gen. N. A. Plants, ii. 158 (1818); T. & G. Fl. N. A. (largely var. *pendulus*). *A. hirsuticaulis* Lindl. in D. C. Prod. v. 242 (1836). *A. miser* var. *diffusus* T. & G. Fl. N. A. ii. 130 (1841), largely var. *pendulus*. *A. miser* var. *hirsuticaulis* T. & G. l. c. *A. miser* var. *glomerellus* T. & G. l. c. in part at least. *A. diffusus* var. *hirsuticaulis* Gray, Synopt. Fl. i. pt. 2. 187 (1884). *A. lateriflorus* var. *hirsuticaulis* Porter, Mem. Torr. Bot. Club, v. 324 (1894). ? *A. lateriflorus* var. *glomerellus* Burgess, in Brit. & Brown, Ill. Fl. ed. 1, iii. 380 (1898).—Stems purplish (green in shade), 6–12 dm. high, slightly arching, branched to below the middle, varying from glabrous to curly-villous: branches subsimple, ascending-arching to wide-spreading, usually decreasing in length upward: leaves lanceolate to elliptic-lanceolate or oval-lanceolate, 5–8(–15) cm. long, 1–2(–2.9) cm. wide, 8.3 times as long as wide or less, rather thin, sparingly serrate or subentire, tapering to the base and acute apex, glabrous beneath except usually the villous midrib, more or less scabrous above: rameal leaves linear-lanceolate to elliptic-lanceolate, acute, soft, usually with smooth margins, the primary 7–30 mm. long: heads more or less racemosely or spicately or subpaniculately arranged on the primary branches, usually more or less unilaterally disposed,

about 1 cm. in diam.: involucre 4–5.5 mm. long, the bracts glabrous, in few series, usually rather firm and broad, pale toward the base, greener and often slightly dilated toward the apex, rather gradually acute from the middle; midrib rarely rhomboidally dilated; inner bracts 3.5–4.5(–5) mm. long: rays (9–)11–12(–14), white, rarely purple-tinged, with corollas (4.5–)5–6(–6.5) mm. long, 0.7–1.2(–1.5) mm. wide, usually more or less reflexed and relatively inconspicuous: disk florets at length deep purple, the corollas 3.0–4.3(–4.8) mm. long, with limb open-campanulate (goblet-shaped) and deeply lobed in full anthesis; lobes (1.0–)1.1–1.6 mm. long, 50 to 75 per cent of the length of the whole limb, recurved: achenes 1.6–2.3 mm. long, generally somewhat hairy.—Banks, thickets, open woods and shores usually in rather dry, but also in damp or even wet, sandy or gravelly soil: Magdalen Islands and Prince Edward Island, southward through Nova Scotia and Quebec to western Massachusetts, Connecticut and northern Pennsylvania, infrequently and also less typically in the mountains to North Carolina: found also in Ontario and northern Michigan. The typical form is apparently rare or absent along the coast south of Maine. In general the cauline pubescence seems to be better developed in the north.

Var. *PENDULUS* (Ait.) Burgess. *A. pendulus* Ait. Hort. Kew. iii. 205 (1789). *A. lateriflorus* var. *pendulus* Burgess, in Brit. & Brown, Ill. Flora No. States and Canada iii. 380 (1898), as to name bearing synonym, scarcely as to plant. ? *A. divergens* Ait. l. c. 205. ? *A. horizontalis* Desf. Cat. ed. 3, 402 (1829).—Stems less frequently villous, often glabrous; branches more slender and spreading, often horizontal or occasionally recurved, frequently long and straggling: cauline leaves rather short and broad, usually rather cuneately narrowed from the middle toward both ends: rameal leaves usually elliptical, rather uniform in size, often rather distant, much smaller than the adjacent cauline and thus conspicuous and often giving the branches in herbarium specimens an interrupted or moniliform appearance: heads averaging slightly smaller.—Damp or rather dry thickets or fields: south-central Maine along the coast to Florida, westward through southern Pennsylvania and Ohio, southern Michigan, Illinois and Missouri to Alabama, Mississippi and possibly Texas: less characteristic northeast of Connecticut. Some specimens examined: MAINE: Gilead, 1897, *K. Furbish*; Woolwich, 1916, *Fernald & Long*, no. 14729. NEW HAMPSHIRE: Hinsdale, 1919, *C. F. Batchelder*. MASSACHUSETTS: Concord-Waltham road, 1857, *E. S. Hoar*; Brookline *C. E. Faxon*, *F. F. Forbes*; Medfield, 1921, *C. H. Knowlton*; Milton, 1893, *E. F. Williams*; Stony Brook Reservation, 1922, *N. T. Kidder*; Framingham, 1909, 1914, *A. J. Eames*. CONNECTICUT: Southington, 1898, *C. H. Bissell*, no. 273; Franklin, 1906, *R. W. Woodward*. NEW JERSEY: Saccosunna, 1867, *Austin*. PENNSYLVANIA: Mt. Hope and Stoneroads Mill, Lancaster County, 1901, *A. A. Heller*; Bradford Hills, Chester County, 1910, *E. B. Bartram*, no.

1285. DELAWARE: Faulkland, 1884, *A. Commons*. MARYLAND: Lanham, 1912, *W. R. Maxon*, no. 5934. VIRGINIA: Norfolk, *Royce*. NORTH CAROLINA: Waynesville, 1897, *E. E. Magee*; Biltmore, 1897, *Bilt. Herb.* no. 40c. GEORGIA: Chattahooche River, 1902, *R. M. Harper*, no. 1754. FLORIDA: Aspalaga, 1897, *Chapman*, no. 40a (distributed by Biltmore Herb.). ALABAMA: Washington County, 1908, *R. M. Harper*, no. 133. MISSISSIPPI: Saratoga, 1903, *S. M. Tracy*, no. 8580. OHIO: Columbus, 1839, *W. S. Sullivant*. KENTUCKY: Bell County, 1893, *T. H. Kearney*, no. 356. TENNESSEE: Knoxville, 1900, *A. Ruth*. ILLINOIS: Canton, 1893, *J. Wolf*; Carlinville, 1890, *W. E. Andrews*; Peoria, 1904, *F. E. McDonald*. MISSOURI: St. Francois County, 1893, *B. F. Bush*, no. 56.

Var. **angustifolius**, var. nov. Foliis anguste lanceolatis vel linearibus.

Leaves narrowly lanceolate or linear, 8.3 times as long as wide or more, the plant otherwise as in the typical form.—Perhaps more often in damp soil and swamps: northern and western New England, northern New Jersey, westward through Ontario and New York to Michigan and Wisconsin; very abundant in central New York. TYPE specimen: Cheshire, Massachusetts, 1915, *J. R. Churchill* (in herb. N. Eng. Bot. Club).

Var. **tenuipes**, var. nov. Gracile, foliis lanceolatis saepe magnis, capitulis tenuipedunculatis paniculatis non unilaterale subspicatis submagnis, ligulis magnis radiatis.

Stems slender somewhat zigzag: branches medium or short, ascending or spreading, mostly above middle of stems, forming a delicate open panicle: leaves lanceolate, rather large, the rameal much smaller, elliptic-lanceolate, thin, conspicuous: heads averaging larger than in the typical form (involucre up to 6.6 mm. high), on long, slender few-bracted peduncles, not on one-sided, subspicate branches: rays up to 15 in number, rather conspicuous, up to 7.5 mm. long and 1.9 mm. wide, spreading.—Damp thickets and swamps: Prince Edward Island, New Brunswick and Nova Scotia. Specimens examined: PRINCE EDWARD ISLAND: Dundee, 1912, *Fernald, Long & St. John*, nos. 8138 and 8140 (latter the TYPE, in Gray Herb.). NEW BRUNSWICK: Victoria County, 1901, *E. F. Williams*. NOVA SCOTIA: Baddeck, 1920, *Fernald & Long*, no. 22770; Ingonish, Cape Breton Island, 1914, *G. E. Nichols*, no. 751.

Variation in this widespread and abundant species is very great, and has given rise to endless confusion in the naming of specimens. A large part of this variation, it cannot be said at present how much, is due to the effect of environment. Fluctuations in composition and wetness of the soil and in light intensity undoubtedly affect the breadth of leaf, hairiness, openness of inflorescence, size of rameal leaves, size of heads, and possibly also the width of involucre bracts.

Also, the size of heads and width of involucre bracts seem to increase slightly, in many cases, as the heads grow older. Hybridity is also a factor in the confusing wealth of form, but it is often very difficult to decide whether a particular variation is due to this cause or to the environment. Apparent hybrids with *A. cordifolius*, *A. dumosus*, *A. ericoides*, *A. ontarionis*, *A. missouriensis*, *A. multiflorus*, *A. paniculatus*, *A. puniceus*, *A. saxatilis*, *A. undulatus* and *A. vimineus* have been noted.

Three of the more distinct types of variation are here recognized as named varieties. The var. *angustifolius* may be nothing more than a separation of the narrow leaved individuals of the typical form. The special abundance of the variety in New York State, and its frequent confusion with *A. vimineus*, which name the specimens often bear, have influenced the writer in recognizing it nomenclatorily. In appearance, too, it has a certain distinctness. The var. *pendulus* is a southern geographical variant, and well worthy of recognition as a variety. The var. *tenuipes*, on further study in the region where it occurs, may prove to be merely a hybrid of *A. lateriflorus* with some member of the *A. paniculatus* group. It certainly has that aspect.

Nomenclature relating to this species is very unsatisfactory. It has not seemed possible to determine definitely the application of the various names of Aiton, Willdenow, Lindley and Desfontanes, most of which were based on garden plants. Even with the aid of specimens bearing these names, made from plants growing in European botanical gardens, and obtained there by Dr. Gray several decades ago, little progress is possible. These specimens and the original descriptions do not clearly accord with any American wild forms. Most of these names have, therefore, been laid aside. The var. *horizontalis* Gray, based on *A. horizontalis* Desf., is one of these garden forms. The specimens bear a slight resemblance in abundance and shape of the rameal leaves to our var. *pendulus*, but the differences are equally great. The var. *bifrons* of Gray is discussed under *A. missouriensis*. Gray's var. *thyrsoides* is apparently also to be referred to *A. missouriensis*. The var. *glomerellus* T. & G. was apparently a habit form, based partly on eastern and partly on western material, the western plants being very probably *A. missouriensis*. The writer has seen no Torrey & Gray specimens bearing this varietal name. The var. *glomerellus* Burgess is also to

be interpreted as a habit form as far as the description is concerned. *A. diffusus* var. *variifolius* Peck¹ was apparently based on certain ecological variants, and is doubtless not a distinct race.

Of his var. *hirsuticaulis* (*A. hirsuticaulis* Lindl., *A. miser* var. *hirsuticaulis* T. & G.) Dr. Gray says: "founded only on specimens from Albany, N. Y., Beck in herb. Torr. & Lindl., is a singular form, probably growing in much shade, with long and narrow leaves, as of *A. vimineus*, the midrib of these beneath and the stem very hirsute. Other forms in Torr. & Gray, Fl., are ambiguous between this and *A. vimineus*."² In his description of typical *A. diffusus* Dr. Gray says further: "either pubescent or almost glabrous." In recent years the name var. *hirsuticaulis* has sometimes been erroneously applied to the hairy forms of *A. lateriflorus* in distinction to the "typical" or glabrous type, while at other times it has been applied to narrow-leaved plants, with little reference to the degree of pubescence. The gradation in pubescence is so gradual, however, and the occurrence of wholly glabrous plants so infrequent, that no varieties based on pubescence can well be made. Also our narrow leaved var. *angustifolius* may be either hairy or glabrous. Certainly if applied to either narrow-leaved forms of *A. lateriflorus*, or to hairy-stemmed forms, it becomes a source of constant confusion, as these characters are neither independent in occurrence nor coexistent. The name var. *hirsuticaulis* may be restricted, therefore, to the original specimens, and dropped from general use.

The *A. pendulus* Ait., judging from the original description and from a specimen so labelled and obtained by Dr. Gray many years ago from plants grown in Europe, accords fairly well with our var. *pendulus*. It has seemed wise, therefore, to retain this name; but the var. *pendulus* of Burgess, based nomenclatorily on *A. pendulus* Ait., does not agree in its description with any form known to the writer. The branches "long, slender, and often pendulous," suggest our var. *pendulus*, but "leaves . . . conspicuously drooping . . . ; heads long-peduncled; rays and bracts often purple-tinged" suggest some form of *A. dumosus*. These characters do not occur in any of the southern specimens of *A. lateriflorus* seen by the writer.

Concerning the *Solidago lateriflorus* of Linneus, it may be noted

¹ Rep. N. Y. State Bot., in Rep. N. Y. State Mus. Nat. Hist. No. 46 (1893).

² Synopt. Fl. N. A. i. pt. 2. 187.

that it was based on a Kalm specimen and therefore is applicable to the northern rather than the southern variants of the species. Whether the leaves of this specimen were narrow or broad is not stated in the description.

A. lateriflorus as a species can best be recognized by the size and character of the corolla lobes, the number and length of rays, the length texture and shape of the involucre bracts, the curly pubescence when present on stems and branches, and the generally pubescent midrib of the rather thin (as compared with *A. paniculatus*) leaves.

4. *A. MISSOURIENSIS* Britton, in Brit. & Brown's Ill. Flora N. States and Can., ed. 1. iii. 378 (1898).—Stem stout and much branched, 8–18 dm. high, green, rarely purplish, coarsely few striate, villous: branches usually strongly ascending, scarcely arcuate, irregular and not conspicuously decreasing in size upward: leaves lanceolate or ovate-lanceolate, tapering toward both ends, 5–11 cm. long, 12–30 mm. wide, rather thin, grayish-green, serrate in the middle, finely and evenly strigose-scabrous or cinereous-puberulent above, evenly and finely pubescent beneath: rameal leaves ascending-spreading, very unequal, lanceolate or linear, acute, puberulent on both faces, the primary about 15 mm. long: heads very numerous, subracemose or subspicate, scarcely secund, about 12 mm. in diam.: involucre short for size of head, 3.2–4.6 mm. long; bracts rather narrow, occasionally oblanceolate, acute, rather soft, more or less puberulent or ciliate at tip, midrib little dilated, margins narrow; inner bracts 3–4 mm. long: rays 15–26, the ray-corollas about 6.5 mm. long, 0.8–1.0 mm. wide, spreading: disk corollas about 12–18, pale yellow or purple, 3–4.3 mm. long; lobes (0.8–)1.0–1.2 mm. long, (41–)55–66% of the length of the whole funnel form limb, spreading: pappus copious, exserted: achenes about 1.8 mm. long, pubescent.—Chiefly in low grounds and bottomlands, in heavy soil (?): Tennessee, Kentucky and southern Michigan to South Dakota, Kansas and Missouri. Specimens examined: TENNESSEE: Mill Creek near Nashville, 1884, *A. Gattinger*. ILLINOIS: Canton, 1893, *J. Wolf*, nos. 15, 16, 17, 20 and 27. IOWA: Clinton, 1896, *L. H. Pammel*, no. 50. MISSOURI: Jackson County, 1893, *B. F. Bush*, no. 145; Courtney, 1902, *Bush*, no. 1786. SOUTH DAKOTA: near Brookings, 1895, *T. A. Williams*. KANSAS: 1887, *J. H. Oyster*.

Var. **thyrsoides** (Gray), comb. nov. *A. diffusus* var. *thyrsoides* Gray (in large part), Synopt. Fl. N. A. i., pt. 2. 187 (1884). *A. miser* var. *glomerellus* T. & G. (as to western plants according to Gray), Fl. N. A. ii. 130 (1841), not *A. lateriflorus* var. *glomerellus* Burgess, in Brit. and Br. Ill. Fl., ed. 1. *A. lateriflorus* var. *thyrsoides* Sheldon, Bull. Torr. Bot. Club, xx. 286 (1893), direct synonym of var. *thyrsoides* Gray.—More strict, with numerous straight ascending branches, abundant smaller ascending rameal leaves, and very

abundant smaller slightly more densely racemose heads: inner involucre bracts 2.8–3 mm. long: disk corollas and their lobes shorter (lobes 0.7–1.0 mm. long, 50–60% of length of whole limb).—Tennessee, Illinois, and possibly Missouri. Specimens examined: TENNESSEE: Hyds Ferry near Nashville, 1884, *A. Gattinger*. ILLINOIS: vicinity of Canton, 1881 and 1888, *J. Wolf* (4 specimens); Carlinville, 1890, *W. E. Andrews*, no. 15.

Specimens here referred to *A. missouriensis* and its variety have passed under various names. Dr. Gray seems to have had only one specimen of the typical form of the species, and that he labelled "*A. diffusus*." Other specimens since added to the Gray Herbarium have been called *A. diffusus*, *A. diffusus* var. *bifrons*, *A. paniculatus*, *A. Tradescanti* and *A. missouriensis*. The plant does not seem to be closely related to *A. lateriflorus* (*diffusus*) however. The form of the involucre bracts and the disposition of the heads suggest rather an intermediate position between *A. lateriflorus* and the *A. paniculatus* group.

The var. *thyrsoides* is retained provisionally, as no other disposition can be made of the six or more specimens referred to this variety, though they come from only three distinct localities. Of the four specimens of this variety in the Gray Herbarium known to Dr. Gray, all bear the name var. *thyrsoides*, while most of the other Gray specimens thus labelled by him have at least some *A. missouriensis* blood. The inclusion of New York in the range given by Dr. Gray for var. *thyrsoides* seems to have been based on a Clinton specimen from Buffalo. This specimen could be interpreted as a hybrid of *A. missouriensis* with *A. lateriflorus* if the former species grew there, which is not known to be the case. This specimen cannot now be interpreted. In recent years the name var. *thyrsoides* has been also incorrectly applied to habit forms of *A. lateriflorus*. Apparent hybrids have been noted of *A. missouriensis* and the var. *thyrsoides* with *A. lateriflorus*, *A. paniculatus*, and *A. vimineus* var. *subdumosus*.

A specimen in the Gray Herbarium labelled "Hb. Lindl. *A. bifrons* Lindl." from Kentucky (Short), and another specimen, apparently a duplicate of this but from Short himself, may be taken to represent *A. bifrons* Lindl.¹ These are unlike any other specimens seen, and, in large heads, long rays and open inflorescence, suggest a cross

¹ *A. bifrons* Lindl. in D. C. Prod., v. 243 (1836). *A. diffusus* var. *bifrons* Gray, Synopt. Fl. i., pt. 2, 187 (1884). *A. lateriflorus* var. *bifrons* Fernald, RHODORA, x. 94 (1908). *A. lateriflorus* var. *grandis* Porter, Mem. Torr. Bot. Club, v. 324 (1894).

between *A. missouriensis* and *A. paniculatus*. *A. bifrons*, therefore, may be interpreted as a hybrid.

5. ***A. ontarionis***, sp. nov. Caulibus diffusis crispopuberulentibus, ramis adscendentibus vel divaricatis, foliis lanceolatis utrinque acutis obscure et sparse serratis, submembranaceis utrinque toteque villosis, foliis ramorum valde inequalibus ellipticolanceolatis, capitulis copiosissimis (10–)13(–15) mm. diam. paniculatis, involucris 3–3.5(–4) mm. longis, bracteis firmis acutis subciliatis stria media elongata apice leviter dilatata, ligulis (18–)20–25 angustis albidis elatis, corollis florum discorum 2.6–4.3 mm. longis albidopurpureis vel albidis, lobis corollorum adscendentibus (0.7–)0.8–1.2 mm. longis (41–)45–60% totius limbi.

Stems 5–15 dm. high, diffusely branched to the middle, crisp-puberulent with whitish hairs: branches mostly ascending: leaves lanceolate, 6–10 cm. long, 8–15 mm. wide, acute at each end and obscurely few toothed, rather thin, short-pubescent above and villous pubescent beneath over the whole surface, passing gradually into the very unequal lance-elliptic rameal leaves; heads very numerous (10–)13(–15) mm. in diam., paniculate (not unilateral nor subracemose): involucre 3–3.5(–4) mm. high, the bracts firm, acute, sparingly ciliate, the narrow midrib green and slightly dilated toward apex; inner bracts (2.6–)3–3.6(–3.9) mm. long: rays (18–)20–25, (4.8–)6–7 mm. long, narrow, 0.6–1.0 mm. wide, white or nearly so, spreading: disk corollas about 3.5 mm. long, pale purple or creamy white; lobes erect or spreading (0.7–)0.8–1.2 mm. long, about (41–)45–60 % of the total length of limb: mature achenes not seen.—Low ground in clay or silty soils, in limestone districts: apparently limited to the upper St. Lawrence Valley not far from Lake Ontario. Specimens examined: NEW YORK: De Kalb, 1914, 1915, *O. P. Phelps*, nos. 947, 1253 and 1709; Potsdam, 1914, 1915, *Phelps*, nos. 950 and 1250 (latter, TYPE in Gray Herb.); Waddington, 1914, *Phelps*, no. 960; Crystal Lake, Redwood, 1922, *Fernald, Wiegand, & Eames*, nos. 14476 and 14477; Black River, Dexter, 1922, *Fernald, Wiegand & Eames*, no. 14478. ONTARIO: Belleville, 1873, *Macoun*, no. 10.

This species resembles the *paniculatus-Tradescanti-saxatilis* group in habit and inflorescence, but the small heads have caused it to appear in herbaria under *A. lateriflorus*, *A. vimineus* and *A. Tradescanti*. From the above group it differs primarily in the deeper corolla lobes. It seems to be a well marked species, though of unusually local distribution. From its closest relative, *A. missouriensis*, it differs in the more slender paniculate diffuse habit, resembling, therefore, *A. Tradescanti*, rather than *A. lateriflorus*.

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